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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,519	12/20/2001	Li Li	MICRON.106C1	9574

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EXAMINER

YEVSIKOV, VICTOR V

ART UNIT PAPER NUMBER

2825

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/027,519

Applicant(s)

LI, LI

Examiner

Victor V Yevsikov

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-45 and 47-49 is/are rejected.
- 7) ☒ Claim(s) 46 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 37, 38, 45, 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (U.S. 5,807,607), cited by applicant.

With respect to claims 1-3 Smith discloses a method of removing at least a portion of a first liquid from a liquid containing layer on a semiconductor substrate, comprising: forming a first layer containing the first liquid on the semiconductor substrate; contacting the first layer with a second liquid which attracts the first liquid in the first layer, thereby transferring at least a portion of the first liquid from the first layer into the second liquid; and separating the second liquid from the first layer, thereby removing at least a portion of the first liquid from the first layer; and inducing a phase transition in the first layer during or after the contacting.

With respect to claims 37, 38, 45, 47-49 Smith discloses a method of treating a semiconductor substrate in a chamber, the method comprising: applying a first liquid comprising silicon and a hygroscopic second liquid onto the substrate; contacting the first liquid comprising silicon and the second liquid with a third liquid which attracts the second liquid, thereby removing at least a portion of the second liquid; and separating the third liquid from the first liquid comprising silicon on the substrate.

Art Unit: 2825

Reference: cols 11-12, lines 30-3; cols. 13-14, lines 19-38; table 5.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-6, 16-20, 27 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dobson (US 5,874,367) and in view of Smith et al. (US 5,807,607).

With respect to claims 4-6 Dobson teaches a method of isolating plural trenches on a substrate, comprising: placing the substrate in a chamber; introducing silicon-containing vapor and hydrogen peroxide vapor into the chamber; reacting the silicon-containing vapor with the hydrogen peroxide vapor to form a liquid layer comprising silicon-containing oligomers and water on the substrate, the liquid layer filling at least a portion of the trenches; separating the hygroscopic liquid from the liquid layer; and heating the liquid layer to a temperature sufficient to form a solid comprising silica in at least a portion of the trenches (cols. 3-5, lines 19-12).

With respect to claims 16-20, 27 and 34-36 Dobson teaches a method of treating a semiconductor substrate comprising: placing the substrate in a chamber; introducing silicon-containing gas or vapor and hydrogen peroxide vapor or other gases into the chamber; reacting the silicon-containing vapor with the hydrogen peroxide vapor to form a liquid layer comprising silicon-containing oligomers and water on the substrate (cols 1-2, lines 34-36).

Art Unit: 2825

Dobson discloses the features out lined above, but does not show exactly a method wherein the step of a treating the liquid layer with a hygroscopic liquid, thereby removing at least a portion of the water in the liquid layer.

However, Smith teaches the method wherein the step of a treating the liquid layer with a hygroscopic liquid, thereby removing at least a portion of the water in the liquid layer (col.11-12, lines 36-3).

It would have been obvious to those skilled in the art method for treating the liquid layer with a hygroscopic liquid, thereby removing at least a portion of the water in the liquid layer as taught by Dobson/Smith for provides process as is routine in the art.

Claims 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dobson (US 5,874,367), in view of Smith et al. (US 5,807,607) and in view of Dobson (US 5,843,535).

With respect to claims 28-33 Dobson ('367) discloses the features out lined above, but does not show exactly a method wherein the interlayer dielectric layer comprises a trench filling with a metal and wherein the substrate comprises a plurality of trenches, the solid comprising silica isolates the substrate between the trenches, and the solid comprising silica forms a dielectric layer over the plurality of metal lines.

However, Dobson ('535) teaches the method wherein the interlayer dielectric layer comprises a trench filling with a metal and wherein the substrate comprises a plurality of trenches, the solid comprising silica isolates the substrate between the trenches, and the solid comprising silica forms a dielectric layer over the plurality of metal lines (col.5, lines 34-43).

Art Unit: 2825

It would have been obvious to those skilled in the art method for filling the plurality of trenches by metal and use silica as dielectric as taught by Dobson ('367)/Smith/Dobson ('534) for provides process as is routine in the art.

With respect to claims 7-12, 21-26 and 39-44 Dobson ('367)/Smith/Dobson ('534) does not show the method of contacting the liquid containing layer with sulfuric acid (at different temperatures and different concentrations) which attracts the first liquid in the liquid containing layer.

However, it is have been obvious to those skilled in the art to method for using the hygroscopic liquid (include sulfuric acid and phosphoric acid, which used as drying fluid in number of chemical methods) as this is a notoriously well known method for removing liquids of which the Examiner takes official notice.

Claims 13-15 are rejected as being prima facie obvious without showing that the claimed ranges (concentration, temperature, process time) achieve unexpected results relative to the prior art range.

In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA 1980) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Art Unit: 2825

***Allowable Subject Matter***

Claim 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor Yevsikov whose telephone number is (703) 3050758. The examiner can normally be reached by telephone on Monday to Friday 7:15 AM to 4:45 PM (except second Mondays).

If attempts to reach the examiner by telephone are unsuccessful, examiner's supervisor, Matthew S. Smith, can be reached on (703) 308-1323. The fax phone numbers for the organization where this application or processing is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communication.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-3080596.

Victor Yevsikov

December 19, 2003

  
CARIDAD EVERHART  
PRIMARY EXAMINER